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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/939,626	08/28/2001	Eiichi Tamaki	50099-175	4531

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EXAMINER	
MILIA, MARK R	

ART UNIT	PAPER NUMBER
2622	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/939,626	TAMAKI ET AL.	
	Examiner	Art Unit	
	Mark R. Milia	2622	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment was received on 7/22/05, and has been entered and made of record. Currently, claims 1-9 are pending.

Drawings

2. Applicant's arguments regarding the objection to the Drawings as cited in the previous Office Action are persuasive as Fig. 4 does show "rectangular area S". Therefore the objection has been withdrawn.

Response to Arguments

3. Upon review of the references of Imakawa and Venkateswar, which were cited in the Office Action dated 4/22/05 under 35 U.S.C. 103, the examiner notes that the reference of Venkateswar discloses the newly added limitation to claims 1 and 6 under the current amendment.

Particularly, as amended, claims 1 and 6 now require " whereby power density for recording each pixel is increased in response to the square of the number N". Venkateswar discloses such a feature (see column 6 line 34-column 7 line 40) as the

reference states that the number of light beams (N) is related to the light intensity level (power density) wherein as the light intensity level increases with the increase in the number of light beams. Further, the increase is such that the light intensity level is increased when the number of light beams is squared. Therefore, the reference of Venkateswar discloses the newly added limitations to claims 1 and 6 as set forth by the current amendment.

4. Applicant's arguments filed 7/22/05 have been fully considered but they are not persuasive. In response to applicant's arguments regarding the rejection of claims 1 and 6, wherein on pages 6-7, the applicant explains how the current invention differs from the teachings of Imakawa and Venkateswar. Particularly, the applicant states that an aspect of the current invention is that a plurality of light beams can be obtained by dividing an original light beam (first light beam) by the spatial light modulator into subsets each of which consists of N adjacent light beams, whereby the N adjacent light beams can be modulated synchronously for each subset by a single image signal and that the references of Imakawa and Venkateswar disclose the plurality of pixels being modulated by different image signals. The examiner respectfully disagrees with the applicant as the reference of Venkateswar does disclose such a feature. More specifically, Venkateswar discloses that a plurality of light beams can be obtained by dividing an original light beam (first light beam) by the spatial light modulator into subsets each of which consists of N adjacent light beams, whereby the N adjacent light beams can be modulated synchronously for each subset by a single image signal as

shown in Fig. 1 and column 4 lines 41-59 which states that the light beam subset is used to image a single pixel.

5. Therefore, the rejection of claims 1-9, as cited in the previous Office Action dated 4/22/05, is maintained and repeated in this Office Action.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-3, 6, and 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5392060 to Imakawa as cited on Information Disclosure Statement dated March 12, 2004 in view of U.S. Patent No. 5453778 to Venkateswar et al.

Regarding claim 1, Imakawa discloses an image recorder optically scanning an image recording medium in a main scanning direction and a subscanning direction for recording an image on said image recording medium, comprising a light source emitting a first light beam (see Figs. 3 and 4 and column 3 lines 56-60), a spatial light modulator dividing said first light beam into a plurality of second light beams arranged at least in said subscanning direction while modulating said plurality of second light beams in response to image signals (see Figs. 3 and 4 and column 3 line 60-column 4 line 15), a focusing optical system for focusing said plurality of second light beams on a recording medium (see Figs. 3 and 4 and column 4 lines 4-27), and a main scanning system for

scanning said recording medium with said plurality of second light beams in said main scanning direction (see Figs. 2-5 and column 3 line 54-column 4 line 15), wherein said plurality of second light beams constitute a plurality of beam subsets (see Fig. 4 and column 3 lines 56-65), and each beam subset consists of N adjacent light beams in said subscanning direction, where the number N is an integer of at least two (see column 2 lines 51-56 and column 4 lines 45-53).

Imakawa does not disclose expressly said plurality of light beams belonging to each said beam subset are synchronously modulated by a single image signal for a single pixel so that each pixel on said recording medium is recorded by a single beam subset and whereby power density for recording each pixel is increased in response to the square of the number N.

Venkateswar discloses a light source emitting a first light beam (see Fig. 1, column 2 lines 62-63, and column 4 lines 23-25), a spatial light modulator dividing said first light beam into a plurality of second light beams arranged at least in said subscanning direction while modulating said plurality of second light beams in response to image signals (see Fig. 1, column 2 lines 63-65, and column 4 lines 6-10, 23-25, and 37-60), a focusing optical system for focusing said plurality of second light beams on a recording medium (see Fig. 1 (18) and column 4 lines 25-26 and 55-58), and a main scanning system for scanning said recording medium with said plurality of second light beams in said main scanning direction (see Figs. 1 and 2 and column 4 line 60-column 5 line 40), and said plurality of light beams belonging to each said beam subset are synchronously modulated by a single image signal for a single pixel so that each pixel

on said recording medium is recorded by a single beam subset (see Figs. 1 and 2 and column 4 lines 41-59), and whereby power density for recording each pixel is increased in response to the square of the number N (see column 6 line 34-column 7 line 40).

Regarding claim 6, Imakawa discloses an image recorder optically scanning an image recording medium in a main scanning direction and a subscanning direction for recording an image on said image recording medium, comprising a light source emitting a plurality of modulated light beams from a plurality of light emitting devices arranged in said subscanning direction (see Figs. 3 and 4 and column 3 line 56-column 4 line 15), a focusing optical system focusing said plurality of light beams on a recording medium (see Figs. 3 and 4 and column 4 lines 4-27), and a main scanning system for scanning said recording medium with said plurality of light beams in said main scanning direction (see Figs. 2-5 and column 3 line 54-column 4 line 15), wherein said plurality of light beams constitute a plurality of beam subsets (see Fig. 4 and column 3 lines 56-65), each beam subset consists of N adjacent light beams in said subscanning direction, where the number N is an integer of at least two (see column 2 lines 51-56 and column 4 lines 45-53).

Imakawa does not expressly disclose a plurality of light beams belonging to each beam subset are synchronously modulated by a single image signal for a single pixel so that each pixel on said recording medium is recorded by a single beam subset and whereby power density for recording each pixel is increased in response to the square of the number N.

Venkateswar discloses a light source emitting a plurality of modulated light beams from a plurality of light emitting devices arranged in said subscanning direction (see Fig. 1, column 2 lines 62-65, column 4 lines 6-10, 23-25, and 37-60), a focusing optical system focusing said plurality of light beams on a recording medium (see Fig. 1 (18) and column 4 lines 25-26 and 55-58), and a main scanning system for scanning said recording medium with said plurality of light beams in said main scanning direction (see Figs. 1 and 2 and column 4 line 60-column 5 line 40), and a plurality of light beams belonging to each beam subset are synchronously modulated by a single image signal for a single pixel so that each pixel on said recording medium is recorded by a single beam subset (see Figs. 1 and 2 and column 4 lines 41-59), and whereby power density for recording each pixel is increased in response to the square of the number N (see column 6 line 34-column 7 line 40).

Regarding claim 9, Imakawa discloses an image recorder for recording an image on an image recording medium, comprising a photo-generator generating a beam subset composed of a plurality of light beams subjected to a same modulation (see Figs. 3 and 4 and column 3 line 56-column 4 line 15), a focusing optical system focusing said beam subset on said image recording medium (see Figs. 3 and 4 and column 4 lines 4-27), and a scanning mechanism scanning said image recording medium with said light beam set, wherein said beam subset consists of said adjacent light beams (see Figs. 2-5, column 2 lines 51-56, and column 3 lines 56-65).

Imakawa does not expressly disclose, whereby, said beam subset is used to image a single pixel on said image recording medium.

Venkateswar discloses a photo-generator generating a beam subset composed of a plurality of light beams subjected to a same modulation (see Fig. 1, column2 lines 62-65, and column 4 lines 6-10, 23-25 and 37-60), a focusing optical system focusing said beam subset on said image recording medium (see Fig. 1 (18) and column 4 lines 25-26 and 55-58), and whereby, said beam subset is used to image a single pixel on said image recording medium (see Figs. 1 and 2 and column 4 lines 41-59).

Imakawa & Venkateswar are combinable because they are from the same field of endeavor, image recording using spatial modulation and multi-dimensional scanning techniques.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the recording of a single image pixel by a single beam subset as set forth by Venkateswar with the system of Imakawa.

The suggestion/motivation for doing so would have been to provide increased control of particular spatial light modulator elements which in turn increase the ability to control pixel intensity and allow for greater resolution (see column 3 lines 3-22, column 4 lines 15-22, and column 7 lines 12-32 of Venkateswar).

Therefore, it would have been obvious to combine Venkateswar with Imakawa to obtain the invention as specified in claims 1, 6, and 9.

Regarding claim 2, Imakawa and Venkateswar disclose the system discussed in claim 1, and Imakawa further discloses the image recorder satisfying the following inequality: La <= Lb <= (N x La) where La represents the size of a beam spot, formed

by each second light beam on said recording medium, in said subscanning direction, and Lb represents the size of said beam spot in said main scanning direction (see Figs. 5a and 7, column 2 line 52-column 3 line 2, and column 4 line 45-66).

Imakawa & Venkateswar are combinable because they are from the same field of endeavor, image recording using spatial modulation and multi-dimensional scanning techniques.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the recording of a single image pixel by a single beam subset as set forth by Venkateswar with the system of Imakawa.

The suggestion/motivation for doing so would have been to provide increased control of particular spatial light modulator elements which in turn increase the ability to control pixel intensity and allow for greater resolution (see column 3 lines 3-22, column 4 lines 15-22, and column 7 lines 12-32 of Venkateswar) as well as maintaining an image with uniform density even if pitch fluctuations occur (see column 4 lines 50-53 of Imakawa).

Therefore, it would have been obvious to combine Venkateswar with Imakawa to obtain the invention as specified in claim 2.

Regarding claims 3 and 8, Imakawa and Venkateswar disclose the system discussed in claims 1 and 6, and Venkateswar further discloses a numerical value changing element for changing the number N in response to light intensity required for image recording (see column 6 lines 34-57), and a magnification changing element for

changing a magnification of said focusing optical system in response to the number N changed by said numerical value changing element (see column 4 lines 25-26 and 55-58 and column 8 lines 7-30).

Imakawa & Venkateswar are combinable because they are from the same field of endeavor, image recording using spatial modulation and multi-dimensional scanning techniques.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the recording of a single image pixel by a single beam subset and enabling changing of light beam elements and magnification as set forth by Venkateswar with the system of Imakawa.

The suggestion/motivation for doing so would have been to provide increased control of particular spatial light modulator elements which in turn increase the ability to control pixel intensity and allow for greater resolution (see column 3 lines 3-22, column 4 lines 15-22, and column 7 lines 12-32 of Venkateswar).

Therefore, it would have been obvious to combine Venkateswar with Imakawa to obtain the invention as specified in claims 3 and 8.

8. Claims 4-5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imakawa and Venkateswar as applied to claim 1 above, and further in view of U.S. Patent No. 5982553 to Bloom et al.

Regarding claim 4, Imakawa and Venkateswar do not disclose expressly wherein said spatial light modulator is a light valve with no discernible boundaries between adjacent modulating elements.

Bloom discloses wherein said spatial light modulator is a light valve with no discernible boundaries between adjacent modulating elements (see Fig. 1).

Regarding claim 5, Imakawa and Venkateswar do not expressly disclose wherein said light valve is the Grating Light Valve.

Bloom discloses wherein said light valve is the Grating Light Valve (see Fig. 1, column 2 lines 34-47, column 4 lines 48-59 and 42-45, and column 5 lines 38-60).

Imakawa, Venkateswar, & Bloom are combinable because they are from the same field of endeavor, generating images using spatial modulation.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the grating light valve of Bloom with the system of Imakawa and Venkateswar.

The suggestion/motivation for doing so would have been to provide a light valve capable of providing high resolution, switching speeds, and bandwidth (see column 4 lines 42-45 of Bloom).

Therefore, it would have been obvious to combine Bloom with Imakawa and Venkateswar to obtain the invention as specified in claims 4-5.

Regarding claim 7, Imakawa, Venkateswar, and Bloom disclose the system discussed in claim 5, and Imakawa further discloses the image recorder satisfying the following inequality: La <= Lb <= (N x La) where La represents the size of a beam spot, formed

by each second light beam on said recording medium, in said subscanning direction, and Lb represents the size of said beam spot in said main scanning direction (see Figs. 5a and 7, column 2 line 52-column 3 line 2, and column 4 line 45-66).

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark R. Milia whose telephone number is (571) 272-7408. The examiner can normally be reached M-F 8:00am-4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Coles can be reached at (571) 272-7402. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mark R. Milia
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